

Fermilab as a Creative Community

Chris Quigg

Fermilab

Symposium on the Future of Creativity

School of the Art Institute of Chicago · November 3, 2001



**TAUSEND
SCHILLING**

**ÖSTERREICHISCHE
NATIONALBANK**

WIRTSCHAFTSRECHENHEIT

Hubert
GENERAL-DIREKTOR

Hubert
GENERAL-DIREKTOR

1000



ERWIN SCHRÖDINGER





FÜNFTAUSEND
SCHILLING
ÖSTERREICHISCHE
NATIONALBANK

WIEN AM 4. JANUAR 1988

PRÄSIDENT

Generaldirektor

Generalsekretär

5000



5000



MUSTER

WOLFGANG A. MOZART

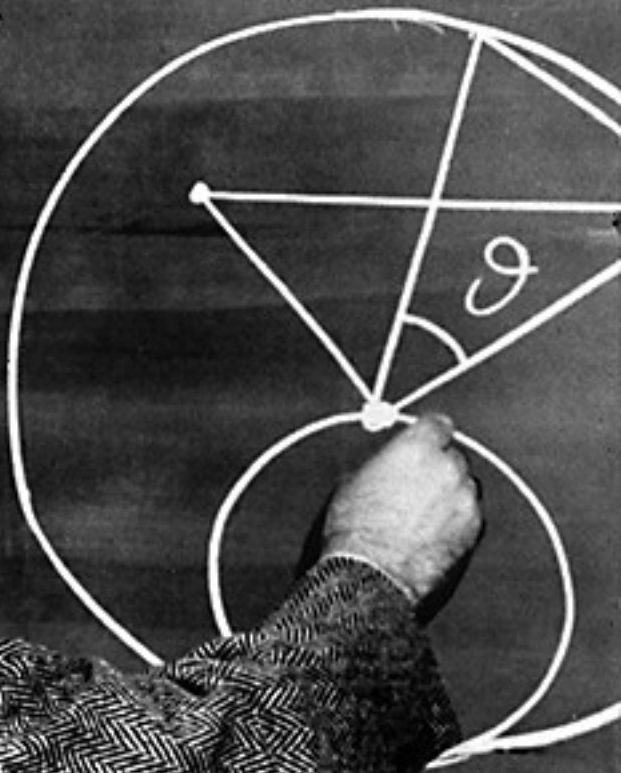
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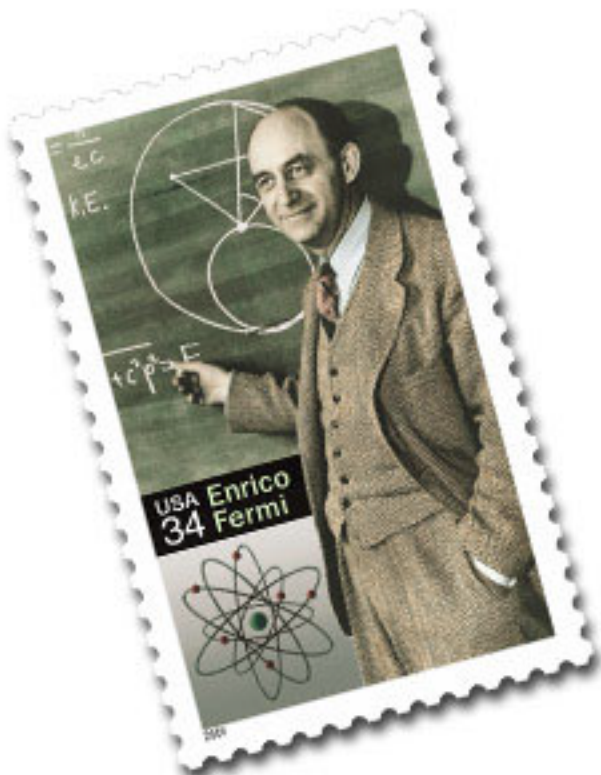




$$-\frac{\hbar}{i} \frac{\partial}{\partial t} = \frac{p^2}{2m} - \frac{Ze^2}{r}$$

$$\alpha = \frac{\hbar^2}{ec}$$























FERMILAB: AN “ARTISTS’ COLONY” ON A GRAND SCALE

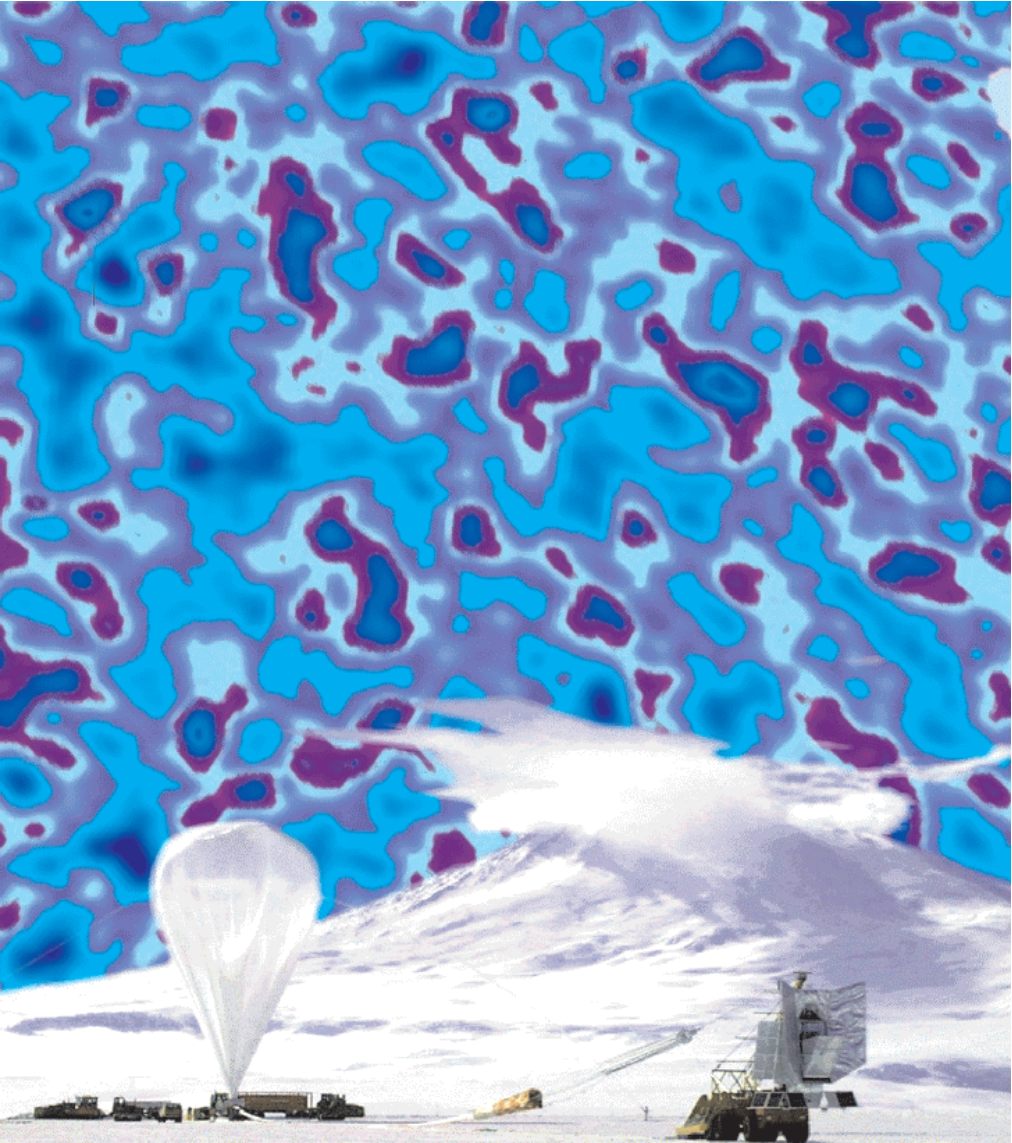
SHELTER · CLOISTER

CITY · BAZAAR

DURING THIS MILLENNIUM we found the courage to reject Authority. We learned instead to listen to Nature by doing experiments—our inheritance from Galileo, Newton, and the eighteenth-century gentlemen of the Royal Society of London.

SCIENCE THROUGH THE MINUTE PARTICULAR ...

examining the very specific to uncover the larger truth that lies behind it



The World's Most Powerful Microscope

Fermilab's Tevatron Collider and Detectors

900-GeV protons: $c - 364$ mph

1-TeV protons: $c - 295$ mph

Improvement: 69 mph!

Protons pass my window 45,000 times per second

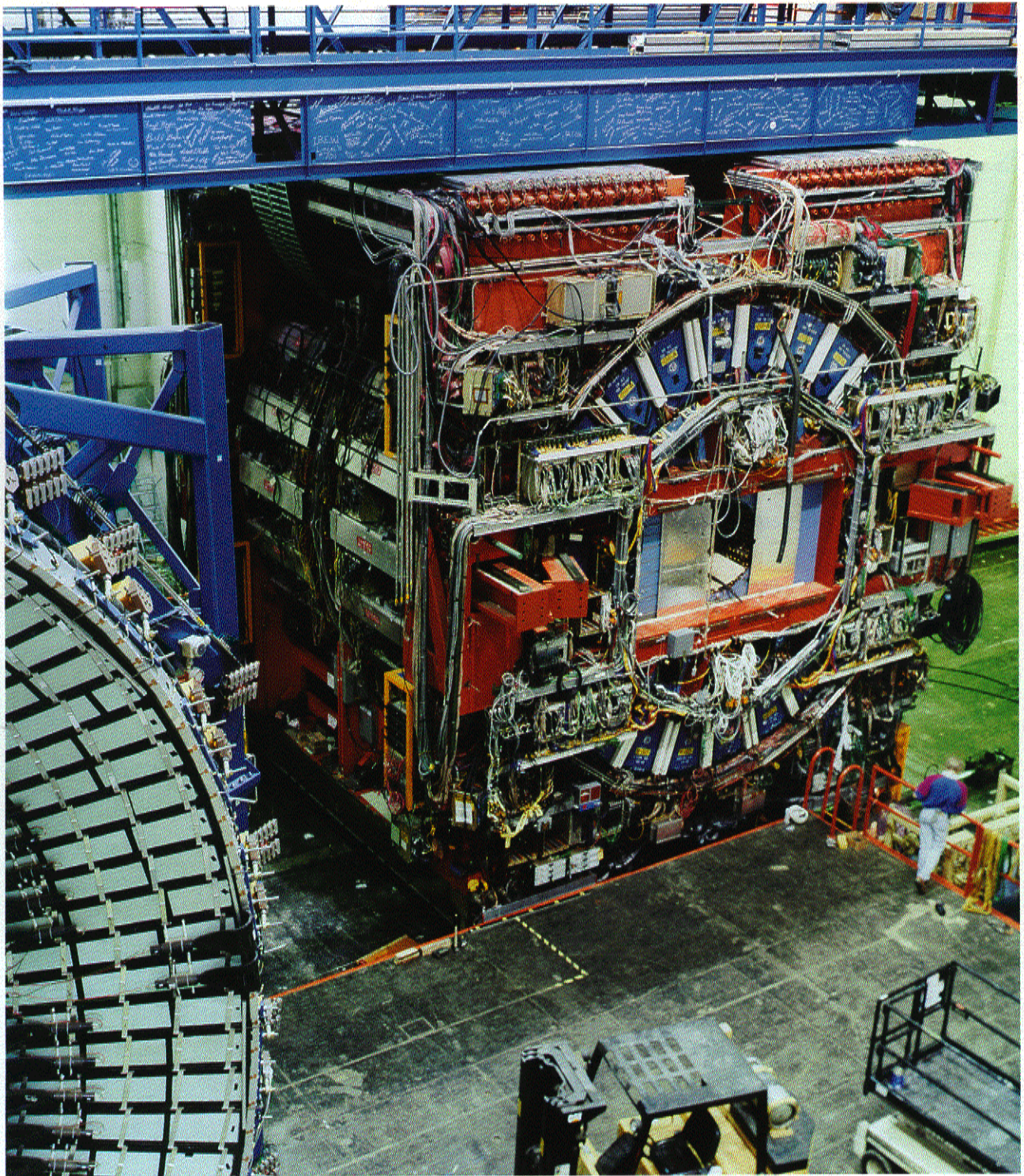
Large Hadron Collider at CERN, $c - 6$ mph



$$\begin{aligned}
\mathcal{L}_{EW} = & \bar{R} i \gamma^\mu \left(\partial_\mu + i g' \frac{1}{2} \rho_\mu Y \right) R + \bar{L} i \gamma^\mu \left(\partial_\mu + i g' \frac{1}{2} \rho_\mu Y + i g \vec{T} \cdot \vec{b}_\mu \right) L \\
& - \frac{1}{4} \vec{F}_{\mu\nu} \cdot \vec{F}^{\mu\nu} - \frac{1}{4} f_{\mu\nu} f^{\mu\nu} + (\partial^\mu \varphi)^\dagger (\partial_\mu \varphi) - V(\varphi^\dagger \varphi) \\
& - \sum_{ij} S_{ij} [(\bar{L}_i \bar{\varphi}) q_{jR} + \bar{q}_{iR} (\varphi^\dagger L_j)]
\end{aligned}$$

PHYSICS TODAY

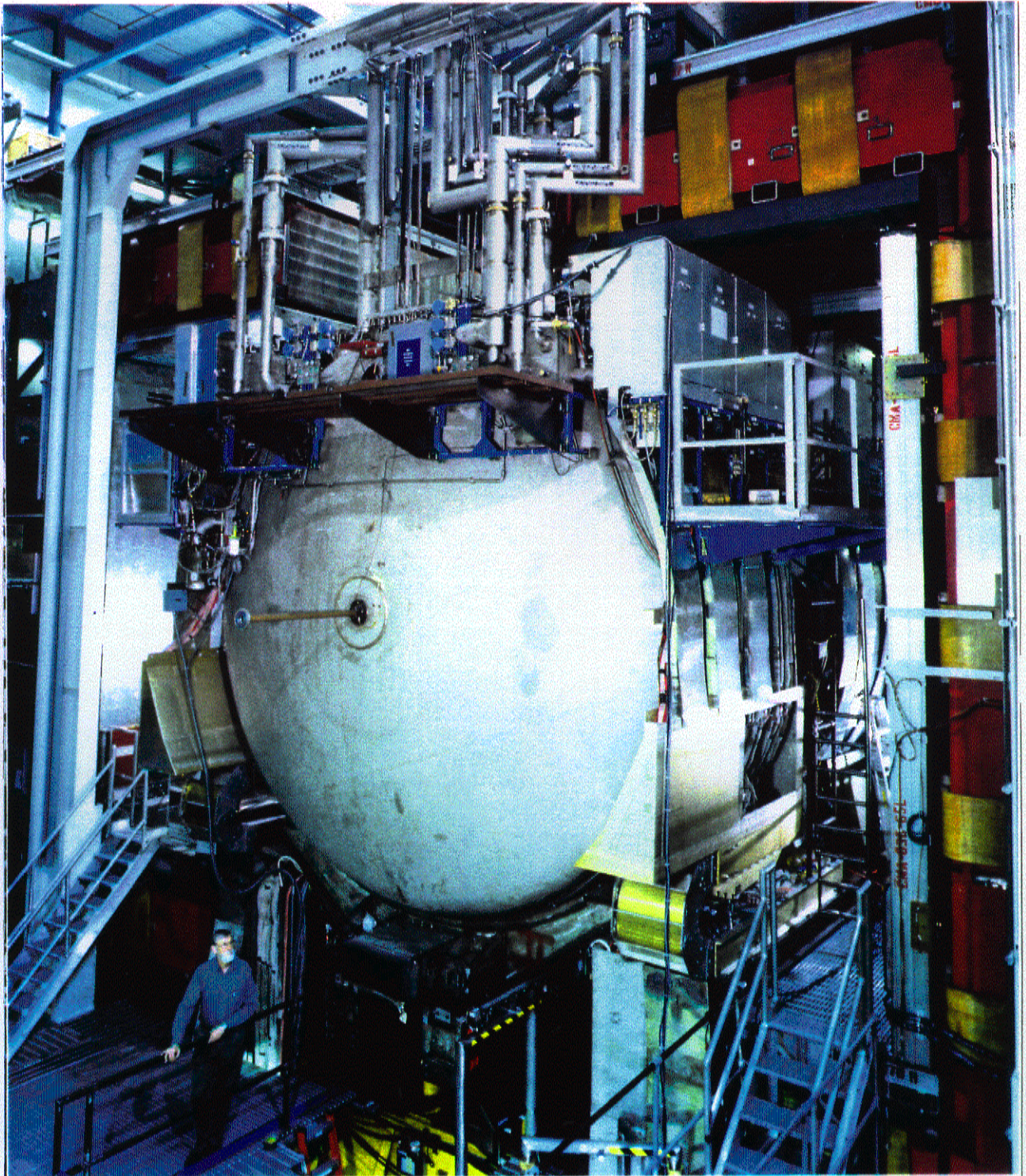
MAY 1997



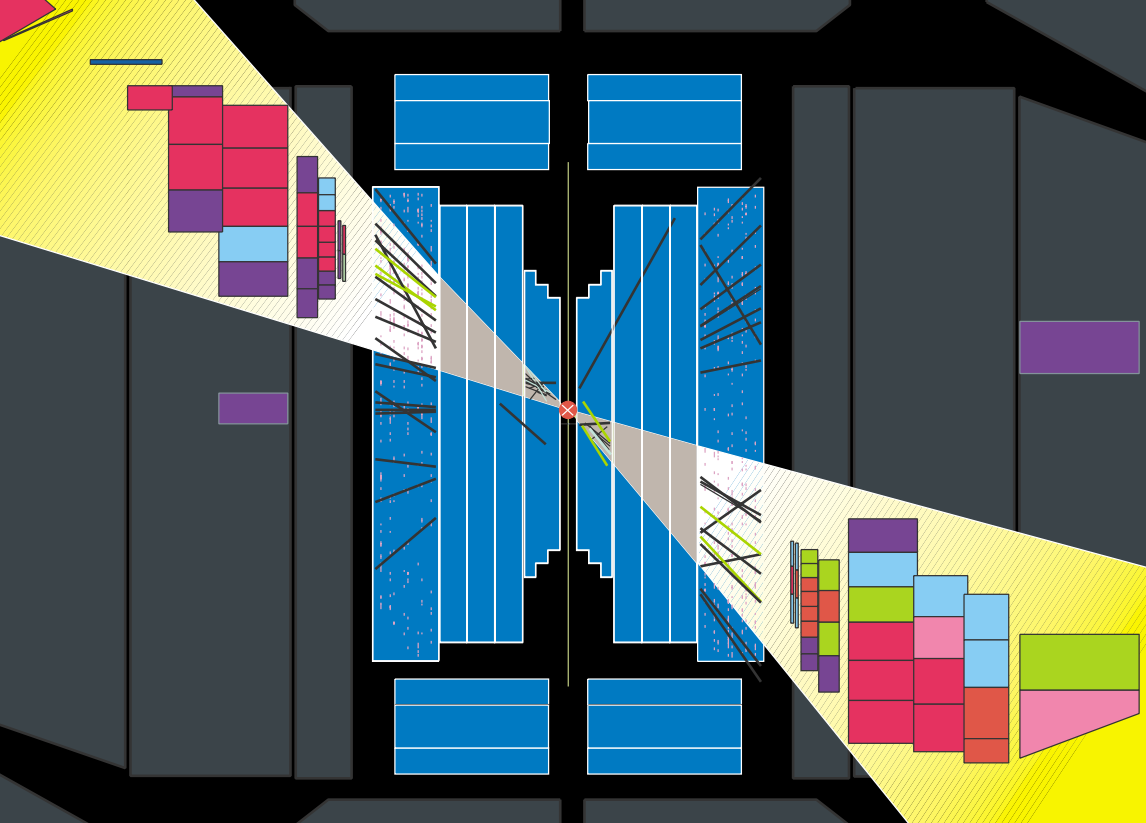
THE REMARKABLE TOP QUARK

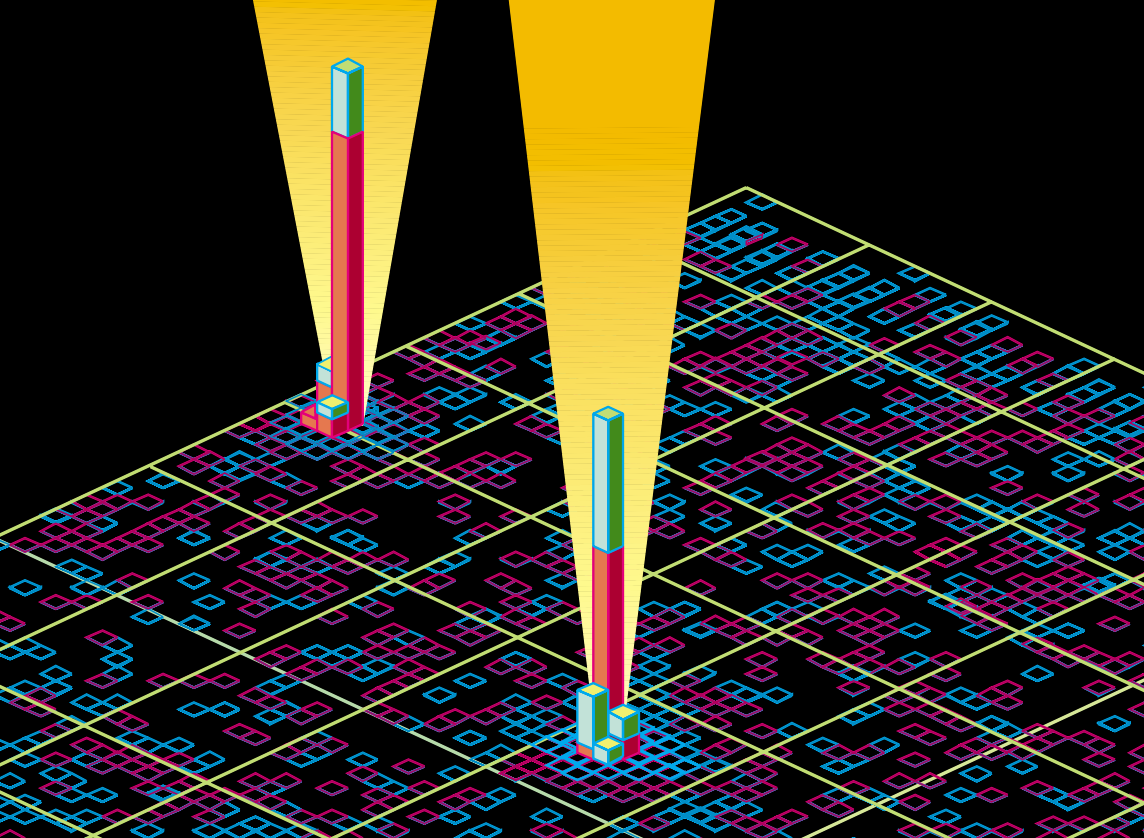
PHYSICS TODAY

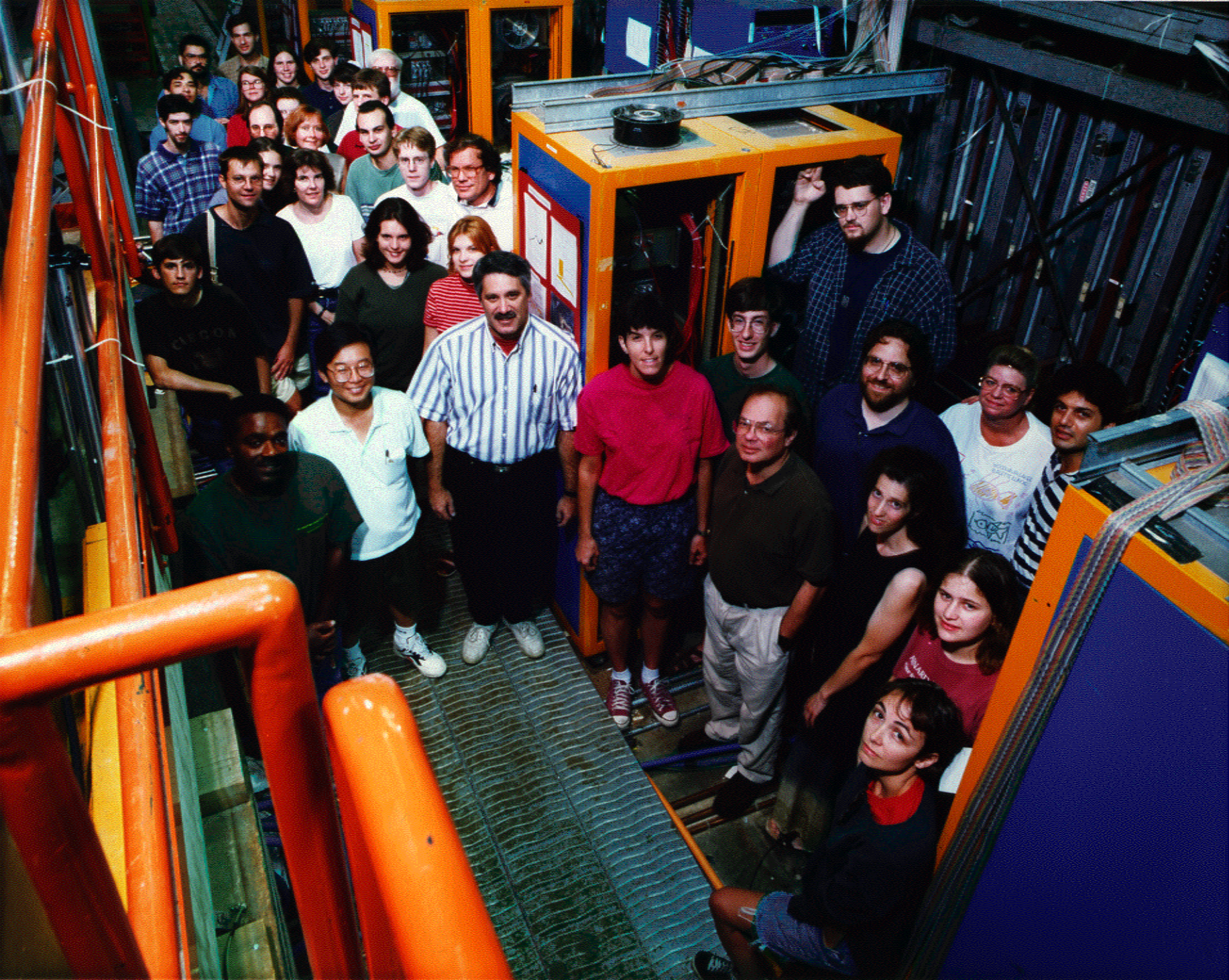
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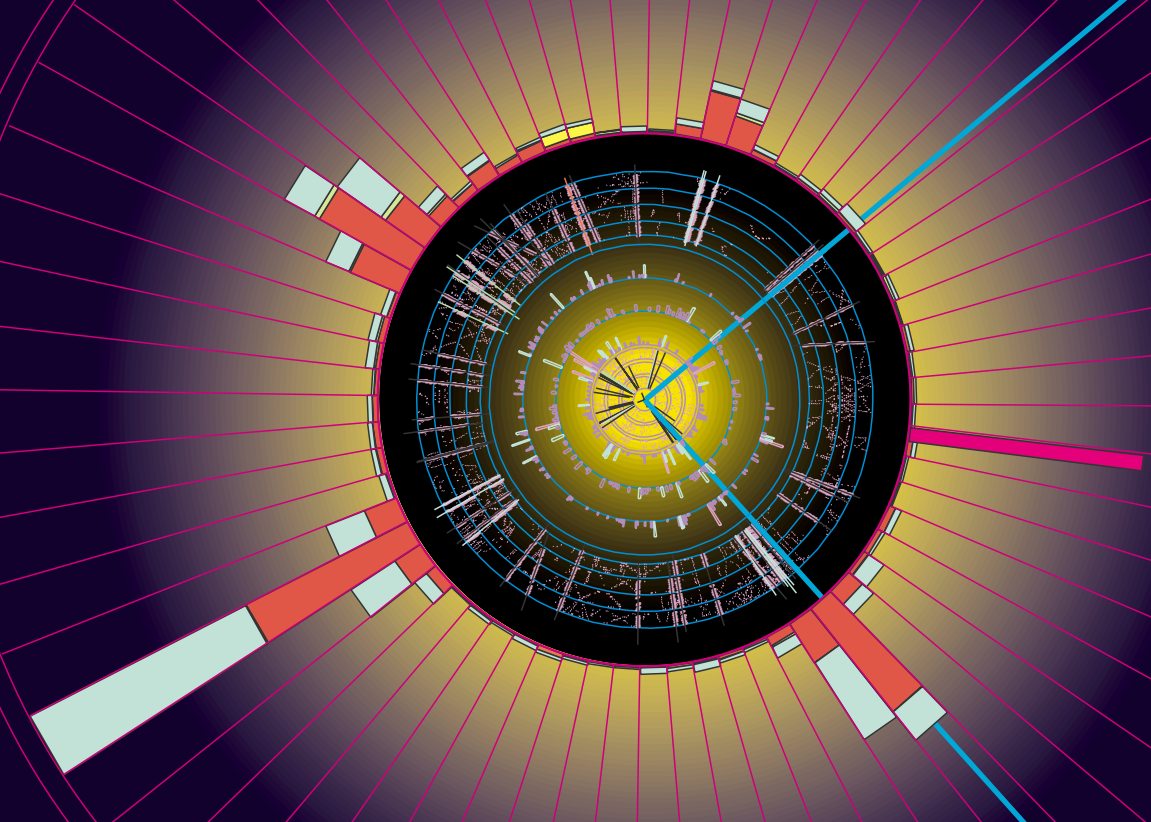


THE REMARKABLE TOP QUARK









The Great Lesson of Science in the Twentieth Century

*The human scale is not privileged for
understanding Nature . . .*

and may even be disadvantaged



Elementarity

Symmetry



Elementarity

Symmetry

Unity



Why not?



Elementarity

Symmetry

Unity

Identity

Elementarity

Symmetry

Unity

Identity

The fabric of space and time



The Goal of Science . . .

. . . gradually reduce prejudice

—Niels Bohr

[T]here has been one transforming change over this thousand years. It is the adoption of the scientific method: the commitment to experiment, to test every hypothesis. But it is broader than science. It is the open mind, the willingness in all aspects of life to consider possibilities other than the received truth. It is openness to reason.

—Anthony Lewis, *New York Times*, 12/31/99

